Economic Analysis of Projects

Prop 1E Stormwater Flood Management Grant Program - Round 1

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Overview of Presentation

- Purposes
- Overview and structure of Prop 1E SWFM PSP economic analysis
- Cost information
- Benefit information

Purposes of Presentation

- Help applicants understand the economic analysis requirements
- Provide additional guidance where PSP offers options
- Discuss difficult parts of economic analysis
- Answer general questions; proposal-specific questions in breakout sessions
- Collect information needed to develop Frequently Asked Questions (FAQ) for economic analysis

Each Proposal Must Include

- Cost details for each project
- Description of the project's benefits by reference to a future without the project: who, when and where
- Quantified estimates of physical benefits, if feasible
- Quantified economic benefits, if feasible
- Adequate quality and documentation of benefits consistent with project cost

Principles for Economic Analysis

- With-project and without-project conditions should be consistent across projects
  - Except flood damage reduction is evaluated at current level of development
- Include all costs, not just grant-funded portion
- Assumptions for quantitative analysis
  - Analysis period must equal project life
  - Use 6 percent to discount future real costs, benefits
  - Show all costs and benefits in year 2009 dollars
  - Real costs or benefits can trend over time

Planning Horizon Analysis

- Use average annual values at current level of development for flood damage reduction benefits
- Account for timing of costs and changing conditions over future years
- Do not confuse a hydrologic sequence with a planning horizon

Costs to be included

- All capital, O&M, and future replacement
- All associated costs (needed to achieve benefits)
- Include current market value (opportunity cost) of any resources (land, volunteer labor) committed to the project, even if they were purchased in the past
- If there is no current market value (sunk cost) do not include it

Cost tables to be included

- Table 10 for a project whose primary purpose is flood damage reduction.
- Table 14 for a project whose primary purpose is water supply, water quality, or other benefit
- Tables 10 and 14 must be consistent with Table 7 in the Budget section

Types of Benefits Allowed

- Flood Damage Reduction
- Water Supply (scored with flood damage reduction)
- Water Quality
- Other (scored with water quality)

Benefit estimates must realistically reflect what the agency would do in absence of project

Flood Damage Reduction Benefits

- Minimum information is a qualitative description of protected area and expected benefits
- Use Expected Annual Damages (EAD) approach to quantify benefits
  - Present value calculations should assume existing conditions (current level of development) into the future
- Provide benefits information using Tables 11 and 12, or similar
- Figure 1 is not required
- Additional FRAM detail in breakout sessions (extra slide)

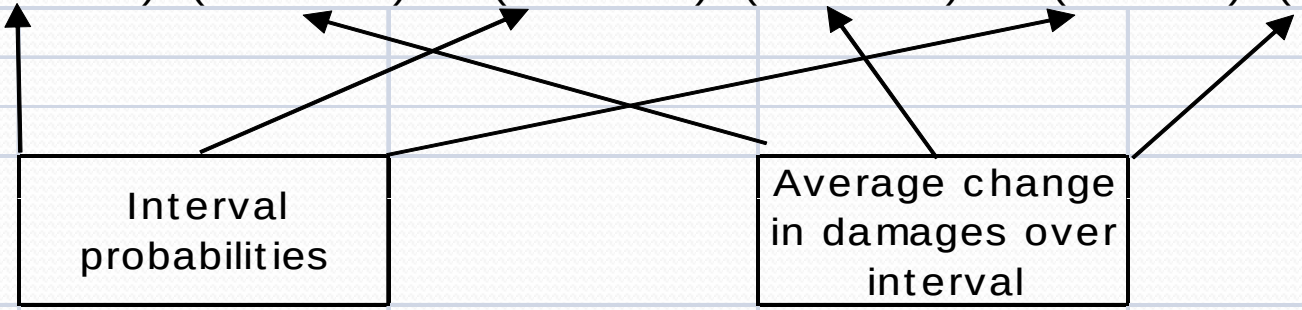
How to Calculate EAD

EAD is not the sum of the exceedance probabilities times the changes in event

EAD is the sum of the interval probabilities times the average changes in dama
over the interval

	Event Damages		
Exceedance Probability	**Without Project**	**With Project**	**Change in Event Damages**
10.0%	$100,000	$0	$100,000
6.7%	$300,000	$0	$300,000
5.0%	$600,000	$0	$600,000
4.0%	$800,000	$800,000	$0

EAD($000) = (0.1 - 0.067) * (300 + 100) / 2 + (.067 - .05) * (600 + 300) / 2 + (.05 - .04) * (0 + 600) / 2



Considerations for Using FRAM

- Some default data are region-specific
- DWR will accept the default data if the applicant provides evidence that the data are representative for their project
  - If default data in FRAM is not appropriate, change the default data or use a different model
- If you use FRAM, provide the model with your inputs and results
- If you use a different model or analysis, provide a similar level of detail

Additional FRAM Information

- Documentation is provided on the DWR IRWM SWFM web page
- Specific directions:
  - Input numbers of structures inundated,
  - Check sq footage, construction costs, depth-damage curves.
  - OR, input results from HEC-FIA or equivalent analysis, if available
  - If you are claiming contents damage, you must consider warning time and experience – Input rows 28 and 29.

Seismic Retrofit Projects

- Benefit-Cost Ratio not required
- Must complete Table 13
  - With and without project, show minimum earthquake event magnitudes at which damage is expected, and their probabilities
  - Provide potential inundation damages for each event
  - Note that a project might increase the size of an event at which failure occurs, or it might reduce damage costs for a given event

Water Supply Benefits

- FDR and water supply benefits are scored together
- Examples of water supply benefits associated with stormwater projects
  - Stormwater capture and treatment
  - Infiltration for groundwater recharge

Ways to Estimate Water Supply Benefits

- Reduced or avoided cost of an existing supply
- Increased net revenue from water sales allowed if changes in supply cost or net revenues elsewhere in California are assessed
- Avoided cost of alternative project
- Value of reduced shortage cost if other supplies are not available without the project

Benefits/Cost Savings Tables

- Use Table 15 when, without project, no other project will be implemented. Examples include
  - Avoided water supply purchases
  - Avoided groundwater production
- Use Table 16 when without project, alternative project will be implemented to provide the water supply
- Other (Table 17)
  - e.g., from existing studies not readily adaptable for Table 15 or 16

Avoid Double-Counting Benefits

- Applicants should count only one of the three types of benefits for a unit of physical water supply or water quality benefit in a given year.
- Do not
  - change the without-project condition across benefit types
  - count water cost savings and water energy savings
  - count the same benefit twice across projects
- Applicants can count different types of benefits under certain circumstances. For example: if:
  - The benefit types apply to different time periods
  - The benefit types apply to different parts of the service area

Examples of Projects Using More than One Benefit Type

	Example 1. Buy water to 2016, build other project then		Example 2. Project would supply water to 2 different areas	
Year	AF Purchased	Other Project Expense	AF Purchased Area 1	Other Project Expense Area 2
2010	0		0	
2011	0		50	$5,000
2012	20		50	
2013	20		50	
2014	20		50	
2015	20		50	
2016	20	$1,000	50	
2017	0		50	
etc	0		50	
2059	0		50	
2060	0		50	

Water Quality and Other Benefits

- Water Quality and Other Benefits are scored together
- Examples of WQ/other benefits associated with stormwater projects:
  - Reduced NPS compliance costs (but not fines)
  - Reduced erosion/sedimentation costs
  - Receiving waters habitat benefits from reduced pollution load
  - Recreation benefits

Water Quality Benefits

- Describe and document affected water bodies, beneficial uses, water quality constituents, and benefits
  - Impaired water bodies or sensitive habitats
  - Other affected water bodies, including groundwater
  - Water treatment or wastewater treatment cost savings
- Quantified economic benefits are typically avoided project cost or
  - Avoided treatment costs
  - Avoided cost of another project that provides similar benefit

Other Benefits

- Ecosystem restoration: document where, physical measures, species, who benefits. Use Habitat Evaluation Procedure (HEP) if available
- Recreation: document where, current types and amounts of usage, apply unit day values if possible
- Power (careful not to double count with water cost savings)
- Other environmental: carbon reduction, sustainability

Questions?